What is claimed is:

1. An optical apparatus for bidirectional optical communication comprising:

an optical transmission section that outputs a transmitted light;

an optical reception section that is input with a received light whose wavelength is different from that of the transmitted light;

an apparatus, which includes an optical isolator, outputting the light input thereto, via said optical isolator;

a first optical component, which includes first through third ports, outputting the light input to said first port to said third port, and outputting the light input to said second port to said first port;

a second optical component multiplexing the transmitted light output from said optical transmission section with the light output from the third port of said first optical component, to output the multiplexed light to said apparatus; and

a third optical component separating the light output from said apparatus according to wavelength difference, to output the separated lights to the second port of said first optical component and to said optical reception section, respectively.

2. An optical apparatus according to claim 1,

wherein said second optical component includes a plurality of demultiplexing side ports respectively corresponding to optical signals of a plurality of wavelengths contained in the transmitted light output from said optical transmission section, and a plurality of demultiplexing side ports respectively corresponding to optical signals of a plurality of wavelengths contained in the light output from the third port of said first optical component.

3. An optical apparatus according to claim 1, further comprising;

a supervisory control section that controls at least one of said optical transmission section, said optical reception section and said apparatus, based on at least one of operational states of said optical transmission section, said optical reception section and said apparatus.

4. An optical apparatus according to claim 1,

wherein said transmitted light and said received light each contains a plurality of optical signals of different wavelengths, and

said first optical component, said second optical component, and said third optical component each has; a plurality of demultiplexing side ports respectively corresponding to wavelengths of a plurality of optical signals contained in said transmitted light, a plurality of demultiplexing side ports respectively corresponding to wavelengths of a plurality of optical signals contained in said received light, and one multiplexing side port.

5. A node apparatus including a plurality of optical input-output ports connected with an optical transmission path which propagates a plurality of optical signals of different wavelengths bidirectionally, for performing the switching of optical signals respectively input to and output from said plurality of optical input-output ports,

wherein a plurality of optical apparatuses in claim 1 is provided respectively corresponding to said plurality of optical input-output ports, and the first ports of the first optical components of said plurality of optical apparatuses are connected with corresponding optical input-output ports,

and there is provided a switch circuit capable of arbitrarily switching connections between transmission data input ports of the optical transmission sections and receiving data output ports of the optical reception sections of said plurality of optical apparatuses.

6. An optical apparatus for bidirectional optical communication which performs predetermined optical processing on transmitted light output from an optical transmission section to send out this to an optical transmission path, and also performs said predetermined optical processing on received light having a wavelength different to that of the transmitted light, which has been propagated through said optical transmission path in a direction opposite to that of the transmitted light, to give this to an optical reception section, comprising;

an optical processing section that performs said predetermined optical processing on optical signals propagated in a single direction; and

first to third optical multiplexing/demultiplexing sections each including a plurality of demultiplexing side ports respectively corresponding to the wavelengths of the transmitted signal and the received signal, and a single multiplexing side port, and having a transmission characteristic capable of multiplexing the transmitted light or the received light input to each of the demultiplexing side ports to output the multiplexed light from the multiplexing side port, and also demultiplexing the wavelength multiplexed light input to the multiplexing side port to output the demultiplexed lights from the demultiplexing side ports corresponding to the wavelengths,

wherein said first optical multiplexing/demultiplexing section is connected with one end of said optical transmission path at the multiplexing side port thereof,

said second optical multiplexing/demultiplexing section is connected with the optical output port of said optical transmission section at the demultiplexing side port thereof corresponding to the wavelength of the transmitted light, connected with the demultiplexing side port corresponding to the wavelength of the received light of said first optical multiplexing/demultiplexing section at the demultiplexing side port thereof corresponding to the wavelength of the received light, and connected with the optical input port of said optical processing section at the multiplexing side port thereof, and

said third optical multiplexing/demultiplexing section is connected with the optical output port of said optical processing section at the multiplexing side port thereof, connected with the demultiplexing side port corresponding to the wavelength of the transmitted light of said first optical multiplexing/demultiplexing section at the demultiplexing side port thereof corresponding to the wavelength of the transmitted light, and connected with the optical input port of said optical reception section at the demultiplexing side port thereof corresponding to the wavelength of the received light.

7. An optical apparatus according to claim 6,

wherein said first to third optical multiplexing/demultiplexing sections are integrated using a common optical device.

8. An optical apparatus according to claim 7,

wherein said first to third optical multiplexing/demultiplexing sections are each constructed using an arrayed waveguide grating.

9. An optical apparatus according to claim 6,

wherein said optical processing section is provided with a function for monitoring the spectrum of an input optical signal.

10. An optical apparatus according to claim 6,

wherein said optical processing section is provided with a function for amplifying an input optical signal to output the amplified optical signal.

11. An optical apparatus according to claim 6,

wherein said optical processing section is provided with a dispersion compensation function for an input optical signal.

12. An optical apparatus according to claim 6, further comprising;

a supervisory control section that supervises at least one of operating states of said optical transmission section, said optical reception section and said optical processing section, and controls at least one of said optical transmission section, said optical reception section and said processing section, based on the supervisory information.

13. An optical apparatus according to claim 12,

wherein said optical processing section is provided with a function for monitoring the spectrum of an input optical signal, and

said supervisory control section controls the power of the transmitted light output from said optical transmission section, based on the spectrum information of the optical signal monitored by said optical processing section.

14. An optical apparatus according to claim 12,

wherein said optical processing section is provided with a function for amplifying an input optical signal to output the amplified optical signal, and

said supervisory control section controls a gain of optical amplification in said optical processing section, based on the transmitted light power output from said optical transmission section, and the received light power input to said optical reception section.

15. An optical apparatus according to claim 6,

wherein the transmitted light and the received light each contains a plurality of optical signals of different wavelengths, and

said first to third optical multiplexing/demultiplexing sections each has; a plurality of demultiplexing side ports corresponding to the wavelengths of the plurality of optical signals contained in said transmitted light, a plurality of demultiplexing side ports corresponding the wavelengths of the plurality of optical signals contained in said received light, and one combined side port.

16. An optical apparatus according to claim 15,

wherein the plurality of optical signals contained in the transmitted light are arranged in a wavelength band different from a wavelength band in which the plurality of optical signals contained in the received light are arranged.

17. An optical apparatus according to claim 15,

wherein the wavelengths of the plurality of optical signals contained in the transmitted light, and the wavelengths of the plurality of optical signals contained in the received light, are allocated alternately on wavelength grids.

18. A node apparatus including a plurality of optical input-output ports capable to be connected with an optical transmission path which propagates a plurality of optical signals of different wavelengths bidirectionally, for performing the switching of optical signals respectively input to and output from said plurality of optical input-output ports,

wherein a plurality of optical apparatuses in claim 6 is provided respectively corresponding to said plurality of optical input-output ports, and the multiplexing side port of the first multiplexing/demultiplexing section of each of said optical apparatuses is connected with corresponding optical input-output port,

and there is provided a switch circuit capable of arbitrarily switching connections between transmission data input ports of the optical transmission sections and receiving data output ports of the optical reception sections of said plurality of optical apparatuses.

19. A node apparatus for bidirectional optical communication according to claim 18,

wherein said switch circuit is a non-blocking type configuration.

20. A bidirectional optical communication network comprising a plurality of node apparatuses in claim 18.

21. A bidirectional optical communication network according to claim 20,

wherein each of said plurality of node apparatuses is connected with an optical transmission path of a trunk line system and an optical transmission path for a subscriber interface, at each of the input-output ports thereof, and

there is provided the optical apparatus in claim 6 on a subscriber side of said optical transmission path for the subscriber interface.